

**UNISYS**

**CTOS<sup>®</sup>**

**BMULTI/X.25**

**Operations  
Guide**

Release 1.1

Priced Item

April 1991  
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# Product Information Announcement

☐ New Release   ☒ Revision   ☐ Update   ☐ New Mail Code

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**Title****CTOS® BMULTI/X.25 Operations Guide**

This Product Information Announcement announces the release of Revision 1 to the CTOS BMULTI/X.25 Operations Guide.

This guide describes the CTOS BMULTI/X.25 software and provides information necessary for installing and configuring it. It also provides information for operating the BMULTI/X.25 gateway, a system service that allows BMULTI poll/select applications to communicate with host systems over X.25 networks.

In addition to editorial and organizational changes, this revision has been updated to reflect changes to the CTOS BMULTI gateway product, Release 10.1.

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**UNISYS**

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**BMULTI/X.25**

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# Page Status

| Page                 | Issue    |
|----------------------|----------|
| iii                  | Original |
| iv                   | Blank    |
| v through xi         | Original |
| xii                  | Blank    |
| 1-1 through 1-9      | Original |
| 1-10                 | Blank    |
| 2-1 through 2-5      | Original |
| 2-6                  | Blank    |
| 3-1 through 3-2      | Original |
| 4-1 through 4-15     | Original |
| 4-16                 | Blank    |
| A-1 through A-5      | Original |
| A-6                  | Blank    |
| Glossary-1 through 4 | Original |
| Index-1 through 3    | Original |
| Index-4              | Blank    |

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# About This Guide

The CTOS® BMULTI/X.25 filter enables existing BMULTI applications to communicate with a Unisys A-Series host computer over an X.25 Public Data Network (PDN). BMULTI/X.25 uses the BTOS™ X.25 Gateway 9.0 or higher to send and receive information over an X.25 PDN. The BMULTI/X.25 service provides the same application interface as the BMULTI Poll/Select gateway, but communicates with the A-Series host using the X.25 protocol.

All references to BMULTI mean the BMULTI Poll/Select gateway; all references to BMULTI/X.25 mean the filter program running over the X.25 gateway. For more information about the BMULTI gateway, refer to the *CTOS BMULTI Operations and Programming Guide*.

## Purpose

This guide enables system administrators and programmers to install BMULTI/X.25 and create programs that use the filter.

## Scope

This guide describes loading, configuring, installing, and operating BMULTI/X.25.

## Audience

The audience for this guide is the system administrator who wants to install and operate BMULTI/X.25. The system administrator can use sections of this guide to assist operators (nonprogrammers) in configuring and installing BMULTI/X.25. This guide is also for programmers who want to write applications that use BMULTI/X.25 services.



## Prerequisites

System administrators should be familiar with CTOS systems. Programmers should be familiar with CTOS systems, as well as the Editor, Debugger, Linker, and the languages and compilers supported by CTOS.

## How to Use This Guide

This guide provides an overview of the BMULTI/X.25 product, and information necessary to configure and install it.

## Organization

This guide consists of four sections and one appendix:

### Section 1. Overview

This section provides a general introduction to the CTOS BMULTI/X.25 product and a description of its major features.

### Section 2. System Requirements

This section lists the hardware and software requirements for using BMULTI/X.25, as well as other system constraints that may affect the use of the product.

### Section 3. Software Installation

This section provides information on the software installation of BMULTI/X.25. To load the BMULTI/X.25 software from the distribution disks onto the hard disk of a CTOS workstation or shared resource processor, refer to the *CTOS BMULTI Operations and Programming Guide* for more information.

### Section 4. Configuring and Installing BMULTI

This section describes the tasks of configuring BMULTI/X.25 to operate on a CTOS system and loading the product into RAM memory as a system service.

### Appendix A. Status Codes

This appendix lists the status codes that BMULTI/X.25 generates.

A glossary and an index are also included.

## Related Product Information

You may find the following documents helpful in performing the tasks described in this guide. These documents (or their replacements) are published by Unisys Corporation and can be ordered through Corporate Software and Publication Operations.

### Product Documentation

In addition to the *CTOS BMULTI Operations and Programming Guide*, the following printed product information is packaged with release 1.1 of this product:

*CTOS BMULTI Agent Operations Guide (Release 10.1)*

*CTOS BMULTI Operations and Programming Guide (Release 10.1)*

*CTOS Printer Pass-Through (PPT) Operations Guide (Release 2.2)*

### CTOS Documentation

CTOS programmers and operators who want details on CTOS, CTOS procedural interfaces, Standard Software commands, Executive features, and status codes may find the following manuals useful:

*BTOS II Standard Software Operations Guide*

*BTOS II System Reference Manual, 2 vols.*

*BTOS II System Procedural Interface Reference Manual, 2 vols.*

*BTOS II System Status Codes Reference Manual*

*CTOS Executive User's Guide*

*CTOS Executive Reference*

*CTOS Status Codes Reference Manual*

## Notation Conventions

This guide uses the following typographical conventions:

Words that you are to type and that appear on the screen are shown in *italic*.

Parameter names are shown in **bold**.

Keys are shown in uppercase letters, for example, press the GO key.

When two keys are to be used together for an operation, they are hyphenated. For example, SHIFT-RETURN means that while you hold down the SHIFT key, you press the RETURN key.

# Contents

|                               |          |
|-------------------------------|----------|
| <b>About This Guide .....</b> | <b>v</b> |
|-------------------------------|----------|

## **Section 1. Overview**

|                                                                    |            |
|--------------------------------------------------------------------|------------|
| <b>Product Description .....</b>                                   | <b>1-1</b> |
| <b>Features .....</b>                                              | <b>1-3</b> |
| <b>New Features .....</b>                                          | <b>1-3</b> |
| <b>Recommendation X.25 .....</b>                                   | <b>1-4</b> |
| <b>Unisys A-Series/CTOS Connectivity over X.25 .....</b>           | <b>1-5</b> |
| A-Series Host with the CP2000 .....                                | 1-5        |
| A-Series Host Using X.25 MCS .....                                 | 1-6        |
| CTOS Workstation or Shared Resource Processor ....                 | 1-6        |
| BMULTI/X.25 and Virtual Circuits .....                             | 1-7        |
| BMULTI/X.25 and Facilities Negotiation .....                       | 1-8        |
| Support for Character Translation and Extended<br>Characters ..... | 1-9        |
| <b>Tasks and Commands .....</b>                                    | <b>1-9</b> |

## **Section 2. System Requirements**

|                                                    |            |
|----------------------------------------------------|------------|
| <b>Hardware .....</b>                              | <b>2-1</b> |
| Optional Hardware .....                            | 2-1        |
| <b>Software .....</b>                              | <b>2-2</b> |
| Optional Software .....                            | 2-2        |
| <b>Disk and RAM Usage .....</b>                    | <b>2-2</b> |
| <b>Migration and Coexistence .....</b>             | <b>2-4</b> |
| Previous Versions of BMULTI/X.25 .....             | 2-4        |
| Coexistence .....                                  | 2-4        |
| Multiple Gateways Server (MGS) Compatibility ..... | 2-5        |

## **Section 3. Software Installation**

|                                        |            |
|----------------------------------------|------------|
| <b>Files Copied to Hard Disk .....</b> | <b>3-1</b> |
| <b>Commands Created .....</b>          | <b>3-2</b> |

### Section 4. Configuring and Installing BMULTI/X.25

|                                                                          |      |
|--------------------------------------------------------------------------|------|
| <b>BMULTI/X.25 Configuration File</b> .....                              | 4-1  |
| Configuration File Parameters .....                                      | 4-2  |
| Configuration Parameter Definitions .....                                | 4-3  |
| Using Address Categories and Sub-Addressing .....                        | 4-9  |
| <b>Installing BMULTI/X.25</b> .....                                      | 4-11 |
| Installing BMULTI/X.25 with MGS .....                                    | 4-11 |
| Manual Installation on a CTOS Workstation .....                          | 4-11 |
| Manual Installation on the IDS Module .....                              | 4-12 |
| Automatic Installation on a CTOS Workstation at<br>Bootup .....          | 4-12 |
| Automatic Installation on an IDS Module at<br>Bootup .....               | 4-13 |
| Automatic Installation on a Shared Resource<br>Processor at Bootup ..... | 4-13 |
| <b>Deinstalling BMULTI/X.25</b> .....                                    | 4-14 |
| <b>Status Monitor</b> .....                                              | 4-14 |
| <b>BMULTI/X.25 Log File</b> .....                                        | 4-15 |

### Appendix A. Status Codes

|                       |   |
|-----------------------|---|
| <b>Glossary</b> ..... | 1 |
| <b>Index</b> .....    | 1 |

# Figures

|      |                                               |     |
|------|-----------------------------------------------|-----|
| 1-1. | BMULTI Gateway and BMULTI/X.25 Compared ..... | 1-2 |
| 1-2. | A-Series Host with the CP2000 .....           | 1-5 |
| 1-3. | A-Series Host Using X.25 MCS .....            | 1-6 |
| 1-4. | CTOS System Using BMULTI/X.25 .....           | 1-7 |



# Section 1

## Overview

### Product Description

CTOS BMULTI/X.25 is a filter program that enables existing BMULTI applications to communicate with a Unisys A-Series host computer over an X.25 Public Data Network (PDN). Examples of X.25 PDNs include Telenet, Accunet, Tymnet, and Transpac.

**Note:** *All references to BMULTI mean the BMULTI poll/select gateway; all references to BMULTI/X.25 mean the filter program running over the X.25 gateway. The BMULTI poll/select gateway does not need to be used with the BMULTI/X.25 filter.*

The host computer normally accesses the X.25 PDN through a CP2000 (using the X.25 Network Terminal Gateway) or the X.25 Message Control System (MCS). On the local workstation or shared resource processor, CTOS BMULTI/X.25 uses the BTOS X.25 gateway to send and receive information over the X.25 PDN. BMULTI/X.25 can also provide services in a server-client or BNet distributed processing environment.

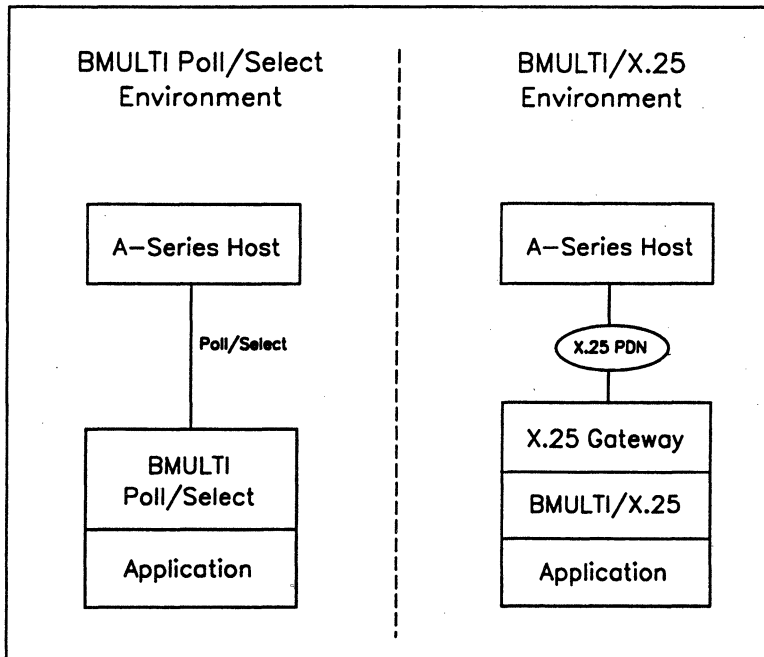
BMULTI/X.25 is installed as a system service and provides the same BMULTI HLI/LLI programmatic interfaces that existing BMULTI applications depend upon. It initiates call set up and clear functions for each application through X.25 Virtual Circuits (VCs). It also handles message transfer between applications and the X.25 gateway, making the X.25 protocol and interface transparent to the BMULTI applications.

BMULTI/X.25 intercepts BMULTI requests from applications, performs functions through the X.25 gateway, and responds through *reports* back to the BMULTI applications. Because BTOS X.25 requires VC 0 for



diagnostic purposes, unlike BMULTI, BMULTI/X.25 provides a maximum of 63 BMULTI stations (VCs). However, multiple copies of the BMULTI/X.25 system service can be installed under the BTOS Multiple Gateways Service (MGS), each instance supporting up to 63 VCs.

Figure 1-1 shows how a configuration using BMULTI/X.25 compares to BMULTI.



**Figure 1-1. BMULTI Gateway and BMULTI/X.25 Compared**

## Features

BMULTI/X.25 offers the following features:

- BMULTI applications can communicate with a remote A-Series host over an X.25 PDN
- BMULTI applications need no modifications to use BMULTI/X.25, so the choice of BMULTI or BMULTI/X.25 is completely transparent to the application
- The BTOS Multiple Gateways Service (MGS) is supported, allowing multiple copies of BMULTI and BMULTI/X.25 to be operating on the same system
- A subset of the X.25 Gateway (on the local system) and X.25 MCS (on the host) user facilities is supported
- BMULTI applications can swap through the Context Manager
- For each copy of BMULTI/X.25 installed (more are possible under MGS), up to 63 sessions can be active at the same time
- BMULTI/X.25 is BNet compatible
- BMULTI/X.25 can be configured to allow access to multiple host systems
- BMULTI/X.25 can communicate with a remote host through the X.25 Network Terminal Gateway running on a CP2000, a front end controller for A-Series host systems, or through the A-Series X.25 MCS, which does not require the CP2000

## New Features

BMULTI/X.25 1.1 offers the following new features:

- BMULTI/X.25 supports the BMULTI Suspend/Resume filter, a facility that allows multiple applications to share the use of a host session. For more information about the Suspend/Resume filter, refer to the *CTOS BMULTI Operations and Programming Guide*.
- Message files have been made compatible with NLS standards.

# Recommendation X.25

The CCITT (International Telegraph and Telephone Consultative Committee) Recommendation X.25 defines the standard interface between packet switched public data networks (PDNs) and user devices operating in a packet switching mode. The BTOS X.25 gateway allows a CTOS system to act as data terminal equipment (DTE), a programmable device on the user end of the network.

Within the network, the BTOS X.25 gateway defines the lower three layers of the International Standards Organization (ISO) reference model for Open Systems Interconnection (OSI) and supports the following protocols:

- Physical (X.21 or X.21 bis)
- Data Link (LAPB)
- Network (Packet)

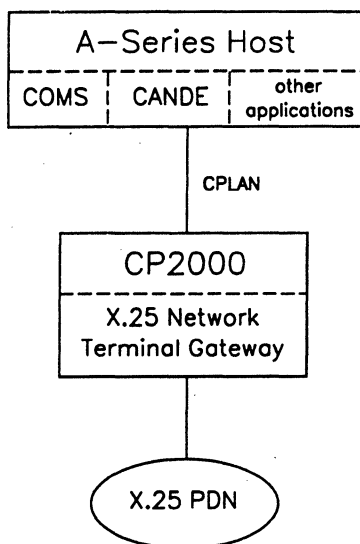
Recommendation X.25 supports many user-negotiable options and facilities. The system administrator must coordinate the facilities used with the PDN administration. When configuring the X.25 gateway and BMULTI/X.25, many of the options are predetermined by the PDN subscription. Refer to the *BTOS X.25 Gateway Operations and Programming Guide* for more information.

## Unisys A-Series/CTOS Connectivity over X.25

BMULTI/X.25 can communicate with the A-Series host in two different configurations.

### A-Series Host with the CP2000

In the first configuration, the A-Series host is equipped with the CP2000 front end system. The CP2000 is connected to the A-Series host through CPLAN, and to the PDN using the X.25 Network Terminal Gateway. The CP2000 then provides X.25 service for both LAPB and the Packet level, which are a part of the BNA V.2 Host Services. An example of the A-Series host with the CP2000 is shown in Figure 1-2.

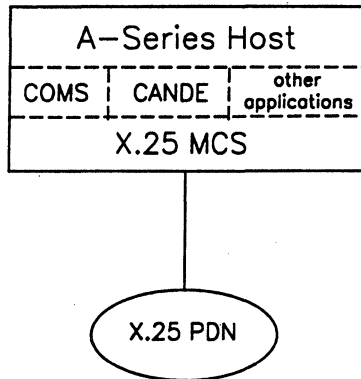


**Figure 1-2. A-Series Host with the CP2000**

The CP2000 performs the call acceptance, X.25 data transfer, and call disconnections transparently to the A-Series host. The calling user can transfer the station to the A-Series host after call acceptance and attach to any A-Series window such as CANDE or COMS. To the host, this appears as a pseudo-station transfer.

### A-Series Host Using X.25 MCS

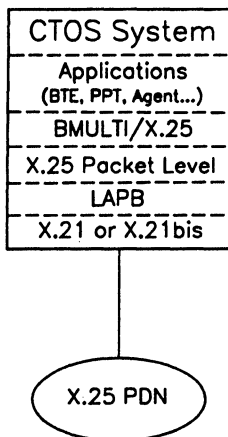
In the second configuration, BMULTI/X.25 can communicate directly with an A-Series host using the X.25 MCS. The X.25 MCS on the A-Series host performs the X.25 call acceptance, data transfer, and call disconnection. Once connected, the user can transfer the station to any window such as CANDE or COMS. An example of the A-Series host and X.25 MCS configuration is shown in Figure 1-3.



**Figure 1-3. A-Series Host Using X.25 MCS**

### CTOS Workstation or Shared Resource Processor

At the CTOS workstation, BMULTI/X.25 establishes an active X.25 virtual circuit (VC) for every BMULTI station and performs data transfer for that station. Upon the completion of a session, it disconnects the connection and closes the VC. An example of a CTOS system configuration is shown in Figure 1-4.



**Figure 1-4. CTOS System Using BMULTI/X.25**

BMULTI/X.25 communicates to the A-Series host using X.25 protocol standards. No poll/select protocol is implemented over X.25, however BMULTI/X.25 provides support for BMULTI library applications to communicate with the A-Series host without any changes.

## **BMULTI/X.25 and Virtual Circuits**

BMULTI/X.25 supports permanent virtual circuits (PVCs) as well as switched virtual circuits (SVCs). Each BMULTI application (Poll/Select address) that requests a connection for a BMULTI session is allocated a virtual circuit, either a PVC or SVC.

The BMULTI/X.25 configuration file requires you to enter logical channel numbers (LCNs) for the desired PVCs. You should also enter the desired number of SVCs. At least one VC must be defined (but it can be of either type). The total number of all PVCs and SVCs for a single instance of BMULTI/X.25 cannot exceed 63.

The BMULTI gateway allows a total of 64 sessions; BMULTI/X.25 allows a maximum of 63 because VC 0 is reserved by the X.25 gateway for diagnostic purposes.

In the BMULTI/X.25 configuration file, if you set the **Map Poll/Select addresses to LCNs** parameter to Y, BMULTI/X.25 waits for the station with the same poll/select address as the LCN number to come up. It then allocates the PVC for the LCN. LCN numbers are fixed for PVCs only, however; SVCs do not use a specific LCN number and simply use the first available address.

If you set the **Map Poll/Select addresses to LCNs** parameter to N, as applications request connections, first all the PVCs are assigned and then all the SVCs. If a station using a PVC goes down, the next station that comes up receives the vacated PVC.

For stations using SVCs, call establishment and call clearance is performed by BMULTI/X.25. It also performs any required negotiation for optional facilities for SVCs, according to the values in the BMULTI/X.25 configuration file.

## BMULTI/X.25 and Facilities Negotiation

PDN facilities negotiation is defined for SVCs only. BMULTI supports the facilities commonly used between the BTOS X.25 gateway and the X.25 MCS on the A-Series host. These facilities include:

- CUG Index
- Reverse Charging
- Throughput Class Negotiation
- Packet Size Negotiation

These optional facilities are negotiated for each call. All applications using SVCs with a specific instance of the BMULTI/X.25 system service (under MGS) use the facilities defined for that instance.

BMULTI/X.25 builds the User Facilities Block (UFB) based on the contents of the BMULTI/X.25 configuration file. It sends this block through the call request packet to the PDN. When it receives a call acceptance packet, it compares the facilities returned with the facilities requested. If the facilities match, BMULTI/X.25 returns error code 0 to the application. If they do not match, BMULTI/X.25 clears the call and sends error code 56256 (Host connection cannot be established) to the application.

## Support for Character Translation and Extended Characters

The character sets for various languages supported by CTOS systems for BMULTI 7.0 and higher are supported by BMULTI/X.25. The default translation file is named BmX25Xlat.sys and is the USA version. Character set translation has no affect on the X.25 gateway interface.

Transmission of extended characters does not apply in the X.25 protocol because data transmission is transparent through the Link level. The limit of the BMULTI 7-bit protocol does not apply in the X.25 environment because BMULTI Poll/Select is a character-oriented protocol while X.25 is bit-oriented. Therefore, the extended characters are transmitted as they are, regardless of the data encoding mode set through the BMULTI library calls SetX.atModeBMULTI or BmSetXlatMode. Extended character transmission has no affect on the X.25 gateway interface.

## Tasks and Commands

| Task                                                    | Command                                       | Section |
|---------------------------------------------------------|-----------------------------------------------|---------|
| Understand how BMULTI/X.25 functions                    | not applicable                                | 1       |
| Determine the system requirements for using BMULTI/X.25 | not applicable                                | 2       |
| Install the BMULTI/X.25 software on a CTOS system       | Software Installation or Installation Manager | 3       |
| Configure BMULTI/X.25 for your system                   | Edit                                          | 4       |
| Install BMULTI/X.25 as a system service                 | Install BMX25                                 | 4       |
| Deinstall BMULTI/X.25 as a system service               | Deinstall BMX25                               | 4       |





## Section 2

# System Requirements

This section describes the hardware, software and other system requirements for using CTOS BMULTI/X.25.

## Hardware

BMULTI/X.25 can be used on CTOS workstations that use any of these processors:

- Real mode (186 processors)
- Protected mode (286 and 386 processors)
- Shared resource processors (XE520 and XE-530)

**Note:** *BMULTI can only be stored on the shared resource processors, that is, its files can be physically located on the hard disk associated with the shared resource processor. The system service can be installed on CTOS workstations or shared resource processors.*

## Optional Hardware

In addition to the previously listed CTOS workstation processors, the following optional hardware can also be used with BMULT/X.25:

- IDS or enhanced IDS module (B25-IDS or B25-ID2)
- B24-TWS peripherals, including when attached to a shared resource processor
- Any CTOS systems printer
- AGP (advanced graphics processor)
- Enhanced Video
- VGA hardware
- EXP (extended processor)

# Software

The following software is required to use this product:

| Software                                 | Release Level |
|------------------------------------------|---------------|
| BTOS II (for CTOS workstations)          | 3.0 or higher |
| CTOS/XE (for shared resource processors) | 3.0 or higher |
| XEBTOS (for shared resource processors)  | 7.0 or higher |
| IDMSS (for IDS and enhanced IDS modules) | 4.0 or higher |
| BTOS X.25 Gateway                        | 9.0 or higher |

## Optional Software

- Multiple Gateways Server (MGS) 1.0 or higher
- BNet 2.1.3 or higher
- Context Manager II 1.2 or higher

# Disk and RAM Usage

For information about hard disk space required for BMULTI/X.25, refer to the *CTOS BMULTI Operations and Programming Guide*.

The RAM usage of the BMULTI/X.25 system service varies depending on how it is configured. As a rough estimate, BMULTI/X.25 requires approximately 55 Kbytes RAM plus 2.5 Kbytes for each station installed using the default parameters. Under these conditions, a minimal configuration with a single connection available would require approximately 58 Kbytes, a mid-range configuration with up to 16 connections requires about 100 Kbytes, and a maximal configuration of up to 63 connections requires about 240 Kbytes.

For more precise calculation, use the following equation:

$$n * (\text{Constant1} + \text{Variable1} + \text{Variable2}) + m * (\text{Constant2} + \text{Variable1} + \text{Variable3})$$

Where:

- |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>n</i>  | is the number of BMULTI/X.25 applications using PVCs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Constant1 | is the memory required for PVC request blocks. Each PVC needs X.25 request blocks of various types and will have them allocated exclusively for that connection. This constant requires approximately 300 bytes.                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Variable1 | is the memory required for each X.25 Receive message. BMULTI/X.25 allocates one Receive Buffer for each connection. This value is configurable and should be greater than or equal to the largest message size expected to be received from the A-Series host. The default value is 2048 bytes.                                                                                                                                                                                                                                                                                                                                                             |
| Variable2 | is the memory required to transmit each X.25 message; this is equal to the X.25 packet size. BMULTI/X.25 copies data from the application into the transmit buffer after translation. Then it sends a "Transmit" request to the X.25 service with this packet. It repeats the process until the data is completely transmitted.<br><br>BMULTI keeps one Transmit buffer for each connection. Applications using PVCs cannot negotiate packet size, so the value of this variable will be equal to the default packet size set in the BMULTI/X.25 configuration file. The default packet size <i>must</i> match the value specified in the PDN subscription. |
| <i>m</i>  | is the number of BMULTI/X.25 applications using SVCs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Constant2 | is the memory required for SVC request blocks. Each SVC needs X.25 request blocks of various types and will have them allocated exclusively for that connection. Some of the SVC request blocks are different from the ones used by the PVCs. This constant requires approximately 300 bytes.                                                                                                                                                                                                                                                                                                                                                               |

**Variable3** is the memory required to transmit each X.25 message. BMULTI/X.25 copies data from the application into the transmit buffer after translation. Then it sends a "Transmit" request to the X.25 service with this packet. It repeats the process until the data is completely transmitted.

BMULTI keeps one Transmit buffer for each connection. Applications using SVCs can negotiate packet size. When the packet size is negotiated, the value of this variable will be the same as the negotiated packet size. If packet size is not negotiated, the value of this variable will be the default packet size set in the BMULTI/X.25 configuration file. The default packet size *must* match the value specified in the PDN subscription.

## Migration and Coexistence

### Previous Versions of BMULTI/X.25

BMULTI/X.25 1.1 replaces BMULTI/X.25 1.0. It provides the same low-level (LLI) and high-level (HLI) interfaces as BMULTI 10.1 and higher. The X.25 Gateway interface access used in BMULTI/X.25 is the packet access method (PAM), which also provides access over a BNet network.

### Coexistence

BMULTI/X.25 can be installed on the same workstation as the BMULTI 10.1 gateway under Multiple Gateway Server (MGS).

In a user environment, BMULTI/X.25 works with applications such as BTE and other terminal emulators, file transfer programs, Printer Pass-Through (PPT), and BMULTI Agent, and routes data directly to the X.25 Gateway.

## Multiple Gateways Server (MGS) Compatibility

BMULTI/X25 is compatible with BTOS Multiple Gateways Server (MGS). Installation under MGS allows you to install multiple copies of BMULTI and BMULTI/X.25 on the same CTOS system.

To function with BMULTI/X.25, MGS needs to be installed with the following constraints for its configuration parameters:

| Parameter                              | Minimum Value               |
|----------------------------------------|-----------------------------|
| Minimum number of requests             | 13                          |
| Minimum number of outstanding requests | $(2 \times \#Stations) + 1$ |
| Minimum number of file handles         | $\#Stations$                |

The value  $\#Stations$  represents the total number of stations for all the copies of BMULTI to be run under MGS.

The minimums described are only the lower limits; MGS can be installed with parameters larger than those listed, and will be larger if other types of gateways are also operating with MGS. The number of stations can be found in the BMULTI/X.25 configuration files.

To operate with MGS, the BMULTI/X.25 configuration file(s) must be modified to include a *ServiceID*. A Service ID is a name of up to 12 alphanumeric characters (no spaces), enclosed by angle brackets (<>). The Service ID is used by MGS to identify different copies of BMULTI and BMULTI/X.25 running on the same system. The system administrator should keep track of all Service IDs assigned.

When BMULTI/X.25 is installed as a system service under MGS, the Service ID is assigned as the partition name.



## Section 3

# Software Installation

To install BMULTI/X.25, you must use the Software Installation procedure for the BMULTI software package; to do this, refer to the *CTOS BMULTI Operations and Programming Guide*.

During the installation, you are offered the option of installing BMULTI/X.25. You may install the BMULTI/X.25 filter, even if you do not install the other BMULTI components or have already installed other BMULTI components.

## Files Copied to Hard Disk

For a complete list of the files copied to the hard disk when installing the BMULTI product, refer to the *CTOS BMULTI Operations and Programming Guide*. If you choose during software installation to install the BMULTI/X.25 gateway, the following additional files are created on your hard disk:

| File                  | Description                               |
|-----------------------|-------------------------------------------|
| <Sys>BmX25.Run        | The BMULTI/X.25 system service            |
| <Sys>BmX25Config.Sys  | The BMULTI X.25 configuration file        |
| <Sys>BmX25MsgFile.bin | The BMULTI/X.25 message file              |
| <Sys>BmX25Unzip.Run   | Deinstalls the BMULTI/X.25 system service |
| <Sys>BmX25Xlat.sys    | The BMULTI/X.25 translation file          |
| <Sys>BmX25Zip.Run     | Installs the BMULTI/X.25 system service   |



# Commands Created

The following commands are created during the installation of the BMULTI/X.25 software:

| Command         | Description                                                                                                                                   |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Install BMX25   | Installs the BMULTI/X.25 filter as a system service (this command is available only if BMULTI/X25 is selected during software installation)   |
| Deinstall BMX25 | Deinstalls the BMULTI/X25 gateway as a system service (this command is available only if BMULTI/X25 is selected during software installation) |

## Section 4

# Configuring and Installing BMULTI/X.25

This section describes how to configure BMULTI/X.25 and install it as a system service on a CTOS workstation or shared resource processor. When a system service is installed, it is loaded into the RAM memory of a CTOS system, where it handles application requests.

## BMULTI/X.25 Configuration File

The BMULTI/X.25 configuration file contains the parameters used by BMULTI/X.25 during operation. To configure BMULTI/X.25 for your environment, use the CTOS Editor to modify the configuration file. (Default name is *[Sys]<Sys>BmX25Config.sys.*)

If multiple copies of the BMULTI/X.25 system service will be installed under MGS, create copies of the configuration file with different file names, and include unique Service IDs in each new file.

*Note: You should always make backup copies of all your configuration files.*

The BMULTI/X.25 configuration file has the following requirements:

- If the value field after the parameter name is left blank, the default value is assumed.
- Parameter names and values must be in exactly the order shown in the default configuration file.
- Parameter names begin and end with the colon (:) character. Values for parameters immediately follow the parameter name, with no spaces between the value and the name.

If these requirements are not met, BMULTI/X.25 may fail to install or have unpredictable results.

# Configuration File Parameters

The BMULTI/X.25 configuration file contains the following parameters:

```
:Service_ID:
:X.25 GW Node Name:
:Delivery Confirmation (default = No):
:Remote Address:
:Buffer Size (default = 2048):
:TimeOut (default = Wait forever):
:Call User Data (default = none):
:Default Packet Size (default = 128):
:Number of SVCs (default = 0):
:LCNs for PVCs:
:VADs:
:Translation Table (default = BMX25Xlat.sys):
:CUG Index (default = none):
:Reverse Charging (default = No):
:Throughput Class Negotiation (default = none):
:Packet Size Negotiation (default = none):
:Log File Name (default = BMX25Log.sys):
:Translate Via Translation Table? (default = No):
:Map P/S address to LCNs? (default = No):
:Append P/S address to Remote Address/Local Address?
  (R or L default = No):
:Map P/S address to Remote Address/User Data? (R or U
  default = none):
:
:
:
:
:
:
```

## Configuration Parameter Definitions

**Service\_ID**  
(default = none)

Defines the MGS Service ID, under which this copy of BMULTI/X.25 is to be installed. The Service ID, if present, must be 1 to 12 characters long, enclosed in angle brackets, and unique for this CTOS system.

**X.25 Gateway  
Node Name**

Defines the BNet node name, shared resource processor board, and Service ID of the X.25 gateway to be used for communication with the PDN.

The node name portion is first, and can be up to 12 characters enclosed in braces. Second, if multiple X.25 packet levels are installed on a shared resource processor, the board name can follow the node name and is enclosed in square brackets. The Service ID is last, and is of the same format as the Service ID above. If the node name is left blank, then X.25 gateway is assumed to be installed on the same workstation as BMULTI/X.25, or its server. If no Service ID is used after the node name, then X.25 gateway is assumed to be installed outside of MGS.

*Example:* {Node1}[Board2]<ServiceID3>

For this parameter, the node name, board name, and Service can be present or absent in any combination, as long as they are arranged in the specified order.

**Delivery  
Confirmation**  
(default = No)

Specifies the "D" bit value for delivery confirmation. Set this value to "Y" for end-to-end acknowledgment, or "N" for local acknowledgment; any character other than "Y" is assumed to be "N".

**Remote Address**

Defines the address of the remote host. This parameter can be up to 15 digits, and can be all or simply part of the complete remote address actually included in the CALL REQUEST packet, depending on the configuration of the address mapping parameters which follow.

How ever this parameter and the address mapping parameters are used, BMULTI/X.25 must be able to generate at least one remote address. Otherwise, the BMULTI installation will fail.

**Buffer Size  
(default = 2048)**

Sets size of BMULTI/X.25 receive buffer. This parameter can be any integer value from 512 to 4096. This value has a direct effect on the RAM memory required to run the BMULTI/X.25 system service.

**Timeout  
(default = Wait  
forever)**

Sets the time (in 100 ms units) to wait for a packet. The system rounds this number to the nearest second. Set this to 0 for no wait; maximum is 65535 (wait forever).

**Call User Data  
(default = none)**

Defines any call user data to be sent in a CALL REQUEST packet, and can contain a maximum of 16 bytes. Refer to CCITT Recommendation X.29 for details.

**Default Packet  
Size  
(default = 128)**

Set this parameter to the default packet size as defined for the X.25 gateway PDN subscription. All applications using PVCs use this value. This is also the packet size for applications using SVCs, unless the Packet Size Negotiation optional user facility is used. The default is 128 bytes; the maximum is 4096 bytes.

**Number of SVCs  
(default = 0)**

Sets the maximum number of switched virtual circuits. Every BMULTI application uses a VC, whether SVC or PVC. This value must be an integer value from 0 to 63.

### **LCNs of PVCs**

Lists logical channel numbers for each permanent virtual circuit through this copy of BMULTI/X.25. The range is from 00 to 99. LCNs must be separated by commas or spaces and may continue onto subsequent lines.

Total PVCs and SVCs must not exceed 63, and at least one VC must be defined.

For example, if you configure BMULTI/X.25 for 10 PVCs and 20 SVCs, the first 10 stations are allocated PVCs and the next 20 are allocated SVCs. If a station using PVC goes down, the next station that comes up gets the vacated PVC.

### **VADs**

Lists BMULTI virtual addresses, separated by commas or spaces. The total number of virtual addresses must not exceed 63.

### **Translation Table (default = BMX25Xlat.sys)**

Specifies the character set translation table file. The default is the USA version.

### **Log File Name (default = BMX25Log.Sys)**

Defines the name of a file where error codes returned by X.25 gateway are logged. If multiple copies of BMULTI/X.25 are installed under MGS, each copy should have a unique log file name.

**Note:** *The optional user facilities which follow are negotiated on a per call basis, and apply to switched virtual circuits only.*

*When operating under MGS, all applications using this copy of the BMULTI/X.25 system service use the facilities defined for this copy.*

**CUG Index**  
**(default = none)**

An optional user facility, defining a two-digit (decimal) index number for the Closed User Group facility. If blank, the CUG facility is not used. Permitted values are 00 to 99.

This facility can only be used if Closed User Group facility is subscribed to with the PDN, and indicates Closed User Group selected for a virtual call. The upper byte of the parameter field is the first digit in binary coded decimal and the lower byte is the second digit.

**Reverse Charging**  
**(default = N)**

An optional user facility, selecting reverse charging, where the PDN fees are assigned to the called system rather than the caller. Enter "Y" to select reverse charging. Any character other than "Y" is assumed to be "N." The DTE requests this facility for a given virtual call, assuming this facility has been subscribed to with the PDN.

**Throughput Class Negotiation**  
**(default = none)**

An optional user facility, defining the desired throughput class for both directions (Tx and Rx) in bps. Valid entries are 75, 150, 300, 600, 1200, 2400, 4800, 9600, 19200, and 48000 bps.

If subscribed to, this facility permits negotiation of throughput classes on a per-call basis. BMULTI receives a call-accept packet only if throughput class specified is acceptable to both the PDN and the called host.

If BMULTI/X.25 does not receive a call-accept packet, BMULTI/X.25 generates an "online-deny" error.

**Packet Size  
Negotiation  
(default = none)**

An optional user facility, when this parameter is set, packet size is negotiated on a per-call basis instead of using the default packet size specified for the X.25 gateway. This value cannot be greater than the maximum packet size specified for X.25 gateway. Permitted values are: 16, 32, 64, 128, 256, 512, 1024, 2048, and 4096. This facility applies to all SVCs and is the same for both transmitting and receiving.

If the packet size received in the call-accept packet differs from that placed in the call-request packet, BMULTI/X.25 clears the call and reports an "online-deny" error to the application.

**Translate Via  
Translation  
Table? (default =  
No)**

Determines whether the translation table is to be used for translating all transmitted and received characters. Set this value to "Y" to enable translation; any value other than "Y" is assumed to be "N". Under the default condition, translation is performed only when requested by the application.

**Map P/S address  
to LCNs?  
(default = No)**

Enables a specific BMULTI Poll/Select address to use a predefined LCN, therefore allowing a fixed end-to-end connection to be used by the Poll/Select application.

If set to "Y", this parameter instructs BMULTI/X.25 to connect the station to a PVC with a Logical Channel Number that matches the given BMULTI Poll/Select address. The default, "N", allocates PVCs on a first-come, first-served basis. Any value other than "Y" is assumed to be "N".



**Append P/S  
address to  
Remote  
Address/Local  
Address? (R or L  
default = none)**

Determines whether the BMULTI Poll/Select address is to be appended to the remote or local address.

If set to "R," for Remote, BMULTI/X.25 appends the BMULTI Poll/Select address of the station to the remote (or called) address for every SVC. If set to "L," the BMULTI Poll/Select address is appended to the local address. This feature can be used to implement a system of subaddressing at the host.

**Map P/S address  
to Remote  
Address/User  
Data? (R or U  
default = none)**

Determines whether BMULTI Poll/Select addresses are to be mapped to the the remote address, or included at the start of the user data in a packet. Using this parameter with address mapping categories can allow you to generate different remote host addresses. This allows different poll/select addresses to access different hosts.

If this parameter is set to "R", for Remote Address, BMULTI/X.25 defines the remote (host) address for any packet as:

RemoteAddress+AddressCategory(+P/SAddress if **Append P/S address** parameter is set to "R" or "L")

If set to "U", BMULTI/X.25 overwrites existing user data (even if null) with the address category. If the user data has more characters than the address category, the additional data is retained.

The RemoteAddress is the **Remote Address**, as defined previously in this configuration file.

The address category is one of up to 63 categories which you can create for your own use. However, categories are only used if you set this parameter to either "R" or "U".

For each address category, type the category number between a pair of colons (:xx:). For example, to create a category for all PPT applications where the connection at the host is number 20, type :20:. The entries must be on the lines immediately after the **Map P/S address to Called Address/User Data** parameter in the configuration file.

Immediately following each address category, type the poll/select addresses of all the applications you wish to associate with the category. Separate P/S addresses with commas or spaces. Continuing the previous example, if three PPT applications use the P/S addresses 13, 14, and 15, you would type :20:13 14 15: or :20:13,14,15.

### Using Address Categories and Sub-Addressing

There are some rules that apply to using address categories:

- Do not specify the same BMULTI Poll/Select address in more than one address category.
- A Remote Address cannot exceed a total length of 15 characters; when selecting the "U" option for this parameter, the address category cannot exceed 16 characters.
- All address categories within a configuration file must be of the same length.

Three examples follow, showing two possible implementations of address categories and one of sub-addressing. Each example shows the last several lines of a hypothetical BMULTI configuration file; some of the full parameter names, however, are not listed due to page space limitations.

### Example 1:

```
:Remote Address:123
:Append P/S address to Remote Address/Local Address?:
:Map P/S address to Remote Address/User Data?:R
:45:13 14
:46:15
```

In this case, there are two remote addresses, 12345 and 12346. Applications using poll/select addresses 13 and 14 will call the remote host with address 12345, and the application with P/S address 15 will call with the address 12346.

### Example 2:

```
:Remote Address:123
:Append P/S address to Remote Address/Local Address?:R
:Map P/S address to Remote Address/User Data?:R
:45:13 14
:46:15
```

Here, there are two basic addresses, 12345 and 12346. Because the **Append P/S address to Remote Address** parameter is set to "Y", the application on P/S address will use the remote host address 1234513, the application on P/S address 14 uses the address 1234514, and the application using P/S address 15 uses the remote address 1234615.

### Example 3:

```
:Remote Address:123456
:Append P/S address to Remote Address/Local Address?:L
:Map P/S address to Remote Address/User Data?:
::
::
```

In this case, address categories are not used. However, BMULTI/X.25 sends a call request packet to the host with the BMULTI application address appended to the X.25 local address. This is how sub-addressing is implemented on the CP-2000.

## Installing BMULTI/X.25

Before installing the BMULTI/X.25 system service, the BTOS X.25 Gateway system service must be installed first. You should do this using the procedures in the *BTOS X.25 Gateway Operations and Programming Guide*.

### Installing BMULTI/X.25 with MGS

If you are installing BMULTI/X.25 under BTOS Multiple Gateways Server (MGS), MGS must be installed as a system service *before* installing BMULTI or BMULTI/X.25.

In addition, each active BMULTI/X.25 configuration file must have a valid (and unique) Service ID in the Service ID field.

### Manual Installation on a CTOS Workstation

As previously indicated, BTOS X.25 Gateway must be installed on the CTOS workstation *prior to* installing BMULTI/X.25. For information on installing the X.25 gateway, refer to the *BTOS X.25 Gateway Operations and Programming Guide*.

Once you edit the BMULTI/X.25 configuration file, you can install the BMULTI/X.25 system service.

1. At the Executive Command line, type *Install BmX25* and press the RETURN key. The following form is displayed:

```
Install BmX25
  [Configuration file name]
```

2. The default BMULTI/X.25 configuration file name is *[Sys]<Sys>BmX25Config.Sys*. If this is not the name of your configuration file, type the name of your configuration file.
3. When you are finished entering the information, press the GO key.

### Manual Installation on the IDS Module

As an alternative to loading BMULTI/X.25 on the CPU of a CTOS workstation, you can instead load it on an IDS or enhanced IDS module attached to the workstation. When running on the IDS module, the CPU processor overhead for BMULTI/X.25 is considerably lower than when running on the CPU module.

**Note:** To install BMULTI/X.25 on the IDS or enhanced IDS module, you must have the module attached to the CTOS workstation, and IDMSS software installed on it.

1. Type *IMRun* and press the RETURN key.
2. Enter the information in the form that appears

```
IMRun
  Processor ID #
  Run File      [Sys]<Sys>BmX25Zip.Run
  [Case]
  [Command]
  [Parameter 1] ConfigurationFileName
  (etc...)
```

If you do not enter a file name in the first optional parameter field, *ConfigurationFileName*, BMULTI/X.25 will use the default configuration file *[Sys]<Sys>BmX25Config.Sys*.

3. When you are finished entering the information, press the GO key.

### Automatic Installation on a CTOS Workstation at Bootup

To install BMULTI/X.25 on a CTOS workstation so that it is available at bootup, edit the file *[Sys]<Sys>SysInit.Jcl*. At some point in the file *after* the X.25 gateway installation, enter the line:

```
$RUN [Sys]<Sys>BmX25Zip.Run, ConfigurationFile
```

(where *ConfigurationFile* is the appropriate file name)

If you do not enter a file name for *ConfigurationFile*, the system will use the default name, *[Sys]<Sys>BmX25Config.Sys*.

## Automatic Installation on an IDS Module at Bootup

To install BMULTI/X.25 on an IDS or enhanced IDS module so that it is available at bootup, edit the file *[Sys]<Sys>SysInit.Jcl*. At some point in the file *after* the X.25 gateway installation, enter the line:

```
$IMRUN #, [Sys]<Sys>BmX25Zip.Run, , , ConfigurationFile
```

(where # is the processor ID number, and *ConfigurationFile* is the appropriate file name)

If you do not enter a file name for *ConfigurationFile*, the system will use the default name, *[Sys]<Sys>BmX25Config.Sys*.

## Automatic Installation on a Shared Resource Processor at Bootup

**Note:** *There is no manual method of installing BMULTI/X.25 system service on a shared resource processor. You must edit the appropriate JCL file and reboot the system. Similarly, to remove BMULTI/X.25 as a system service, you must delete the BMULTI/X.25 entry in the JCL file and reboot the system.*

To install BMULTI/X.25 on a Shared Resource Processor so that it is available at bootup, edit the appropriate JCL file.

On the XE520, this file is either *[Sys]<Sys>InitCPxx.Jcl* or *[Sys]<Sys>InitTPxx.Jcl* for cluster and terminal processor boards, respectively. The number *xx* represents the board number on your system.

On the XE-530, this file is called *[Sys]<Sys>SRPSysInit.Jcl*. This file is divided into sections, one for each of the cluster or terminal processor boards used.

At some point in the file *after* the X.25 gateway installation, enter the line:

```
$RUN [Sys]<Sys>BmX25Zip.Run, ConfigurationFile
```

(where *ConfigurationFile* is the appropriate file name)

If you do not enter a file name for *ConfigurationFile*, the system will use the default name, *[Sys]<Sys>BmX25Config.Sys*.

### Deinstalling BMULTI/X.25

The Deinstall BmX25 command removes BMULTI/X.25 from background processing. This allows you to change installation parameters and reinstall the system service without having to reboot.

- When it is loaded on a CTOS workstation, you must deinstall BMULTI/X.25 on the workstation on which you installed it. You cannot deinstall BMULTI/X.25 from a remote node.
- You must finish any application that uses BMULTI/X.25 before using the deinstall utility.
- The deinstall utility must be executed in the primary partition of the workstation in which BMULTI/X.25 is running. You cannot, therefore, deinstall BMULTI/X.25 when running Context Manager.
- You cannot deinstall BMULTI/X.25 from a single partition operating system (that is, the IDS module).
- You cannot deinstall BMULTI/X.25 from a shared resource processor.

To execute the deinstall utility from the Executive, type *Deinstall BmX25* on the Executive command line and press the RETURN key. If BMULTI/X.25 was installed under MGS, enter the Service ID for the copy of BMULTI/X.25 you want to deinstall. Press the GO key.

### Status Monitor

Because the BMULTI/X.25 is an application to the BTOS X.25 Gateway, the X.25 status monitor can be used to verify the configuration and operational status of your network.

The BMULTI line and status monitors are *not* supported.

## BMULTI/X.25 Log File

BMULTI/X.25 places the error codes returned by the X.25 gateway into the log file. This file can help you to understand various PDN-related and DCE-related problems.

The BMULTI/X.25 configuration file contains the name of the log file (the default is *BMX25Log.Sys*). If multiple copies of BMULTI/X.25 are installed under MGS or on different shared resource processor boards, you should assign a unique name to the log file of each copy of BMULTI/X.25 installed.

The log file is created at the time of BMULTI/X.25 installation, if not already present.

The BMULTI/X.25 log file is organized as follows:

DateTime    UserName    Station Description    X.25 Error Code

Where:

*DateTime* is the date and time at which the error code occurred, in the NLS format used by the operating system.

*User Name* is the name supplied by the user at sign-on (8-character maximum).

*Station Description* is a description of the application as given in the BmOpenII call (8-character maximum).

*X.25 Error Code* is the error code returned to BMULTI/X.25 by the X.25 gateway.





## Section 5

# BMULTI/X.25 Concepts

## BMULTI Applications

BMULTI is a gateway that communicates with the host computer using the poll/select protocol. BMULTI applications are linked with BMULTI.lib, and communicate with BMULTI using the standard CTOS interprocess communication methods.

The BMULTI library is a set of routines that act as an interface between the applications and BMULTI. The library is a task handler, with each BMULTI address having its own task handle. The main function of the task handler is to convert procedural calls into the request block form, which can be sent to BMULTI via interprocess communications. For more information about BMULTI, refer to the *CTOS BMULTI Operations and Programming Guide*.

## The BMULTI/X.25 Filter

The role of the BMULTI/X.25 filter is to enable existing BMULTI applications to communicate with the remote host using X.25 public data networks (PDNs). The filter communicates with the applications via the request/response interface. For an overview of BMULTI/X.25 and more information about how BMULTI/X.25 operates, refer to Section 1, "Overview."

BMULTI/X.25 includes the following files:

| File            | Description                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BmX25.run       | The main filter program. It is installed as a system service; it waits for an application request and maps it to an equivalent X.25 request, which it sends to the X.25 Gateway.<br><br>When it receives a response from the X.25 Gateway, this program reports back to the application with the mapped error code, and inserts any errors into the X.25 error log file (default = BMX25Log.sys). |
| BmX25Zip.run    | The loader program, which checks the configuration file for valid inputs and installs the BMULTI/X.25 server.                                                                                                                                                                                                                                                                                     |
| BmX25UnZip.run  | The de-installation utility.                                                                                                                                                                                                                                                                                                                                                                      |
| BmX25Config.sys | The configuration file, which contains the user-selected parameters. Refer to Section 4 for more information on configuring and installing BMULTI/X.25.                                                                                                                                                                                                                                           |

## BMULTI Library

BMULTI applications are linked with the BMULTI library, BMULTI.Lib, which generates the necessary request blocks. BMULTI/X.25 supports a high-level and a low-level interface (HLI and LLI) that the library provides. For more information about the HLI and LLI, refer to the *CTOS BMULTI Operations and Programming Guide*.

The programming translation from poll/select to X.25 is performed as follows:

## BMOpenII or BmResume

One of these two calls will be the first procedure called by the application, depending on whether BMULTI Suspend/Resume support is required (for more information about the Suspend/Resume filter, refer to the *CTOS BMULTI Operations and Programming Guide*). The call allows a VC to be reserved for the application, and poll/select address, which would be mapped to a VC can be used. In addition, a request can be made using an unused virtual address (VAD) instead of a specific address.

BmOpenII and BmResume also provide BNet support. This allows a request to be routed to a copy of BMULTI/X.25 through BNet.

## BMCommand

This procedure allows commands to be passed from the application to BMULTI/X.25. A BMULTI command is mapped to X.25 gateway request as follows:

| <b>BMULTI<br/>Command</b> | <b>Name</b>          | <b>BMULTI/X.25 Action</b>                                               |
|---------------------------|----------------------|-------------------------------------------------------------------------|
| 4                         | Online               | Place InitiateX25Call request for SVC or ConnectX25Call request for PVC |
| 3                         | Offline              | Place ClearX25Call request for SVC or DisconnectX25Call request for PVC |
| 5                         | Idle                 | Set station to Idle state                                               |
| 2                         | Send Transmit Buffer | Place X.25 write requests                                               |

| <b>BMULTI<br/>Command</b> | <b>Name</b>                     | <b>BMULTI/X.25 Action</b>                  |
|---------------------------|---------------------------------|--------------------------------------------|
| 1                         | Get Receive<br>Buffer           | Give receive buffer to<br>application      |
| 6                         | Set Fast Ready                  | None                                       |
| 7                         | Set Receive<br>Ready            | Place X.25 read requests                   |
| 8                         | Set Transmit<br>Ready           | Place station in transmit<br>ready state   |
| 9                         | End Session                     | Delete station from active<br>station list |
| 10                        | Abort                           | Place ResetX25Call request                 |
| 11                        | Reset Fast<br>Ready             | None                                       |
| 12                        | Transmit<br>Extended<br>Message | Place X.25 write requests                  |

## **BmReports**

This procedure returns the data communications and system status to the application. It generates the following reports:

|    |                           |
|----|---------------------------|
| 0  | No Report                 |
| 1  | Receiving                 |
| 3  | Receive Done              |
| 4  | Ready for Transmit Buffer |
| 5  | Transmit Done             |
| 7  | Receive Error             |
| 10 | Transmit Error            |

## **BmSetXlatMode**

In BMULTI poll/select, extended character modes are needed because it is a seven-bit character-oriented protocol. However, X.25 is a bit-oriented protocol that is capable of transmitting all eight bits of a character, eliminating the need for extended character modes. BMULTI/X.25 does, however, perform character translation, if requested.

For an iRcvMode/iXmitMode of 0, 1, or 2, BMULTI/X.25 does no translation. For an iRcvMode/iXmitMode of 4, 5, or 6, translation is performed using the translation table specified in the configuration file (default = BmX25Config.Sys).



# Appendix A

## Status Codes

**Note:** The status codes below include codes reported for the *BMULTI Poll/Select gateway, the BMULTI Agent, the BMULTI Status and Line monitors, and the BMULTI Suspend/Resume filter, as well as codes specific to BMULTI/X.25.*

| Status Code<br>(Decimal) | Explanation                                                                                                             |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------|
| 60                       | BMULTI cannot be installed on a DCX module because the DCX server is not installed.                                     |
| 65                       | NRZI encoding, TDI, or X.21 electrical interface is not supported by the hardware in the specified channel.             |
| 8401                     | Line in use. This code may also indicate that BMULTI has attempted to use X.21 on a channel that does not support X.21. |
| 31309                    | Invalid or duplicate Service ID.                                                                                        |
| 31310                    | Too many gateway types installed under the Multiple Gateways Service (MGS).                                             |
| 31311                    | Too many copies of BMULTI installed under the Multiple Gateways Service (MGS).                                          |
| 31312                    | Too many requests issued in using BMULTI under the Multiple Gateways Service (MGS).                                     |
| 31600                    | DMA I/O is not supported by the hardware on the specified channel.                                                      |
| 32768                    | An invalid command was issued to BMULTI.                                                                                |
| 32769                    | Task overflow. The multitasking interface cannot handle more than three device addresses.                               |
| 32770                    | Command pending. Only one BMULTI command can be outstanding at any time per address.                                    |



| <b>Status Code<br/>(Decimal)</b> | <b>Explanation</b>                                                                                                                                            |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 32771                            | Report pending. Only one BMULTI report request can be outstanding at any time for an address.                                                                 |
| 32772                            | Invalid BMULTI address.                                                                                                                                       |
| 32773                            | Command denied (Mp Interface).                                                                                                                                |
| 32774                            | Buffer overflow.                                                                                                                                              |
| 32775                            | Invalid report request.                                                                                                                                       |
| 32776                            | Read in progress.                                                                                                                                             |
| 32777                            | Write in progress.                                                                                                                                            |
| 32778                            | A request for a large buffer transfer cannot be honored at this time due to a lack of buffer space. Try again later or reconfigure with a larger buffer size. |
| 32779                            | Invalid buffer length for this command.                                                                                                                       |
| 32780                            | Offline command denied.                                                                                                                                       |
| 32781                            | Online command denied.                                                                                                                                        |
| 32782                            | Idle command denied.                                                                                                                                          |
| 32783                            | Fast Ready command denied.                                                                                                                                    |
| 32784                            | Transmit Ready command denied.                                                                                                                                |
| 32785                            | Receive Ready command denied.                                                                                                                                 |
| 32786                            | Transfer Transmit Buffer command denied.                                                                                                                      |
| 32787                            | Transfer Receive Buffer command denied.                                                                                                                       |
| 32788                            | End Session command denied.                                                                                                                                   |
| 32789                            | Station not online.                                                                                                                                           |
| 32790                            | Station overflow.                                                                                                                                             |
| 32791                            | Device address is identical to group address.                                                                                                                 |
| 32792                            | The buffer received by the application is only part of the full message.                                                                                      |

| <b>Status Code<br/>(Decimal)</b> | <b>Explanation</b>                                                                                                                                                                                                                                |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 32793                            | Internal error (report it to the system administrator).                                                                                                                                                                                           |
| 32794                            | Duplicate virtual address or duplicate X.21 poll/select addresses are configured when attempting to configure BMULTI for X.21 circuit switched mode.                                                                                              |
| 32795                            | BMULTI locked for reconfiguration.                                                                                                                                                                                                                |
| 32796                            | Entry error or no poll/select addresses are configured when attempting to configure BMULTI for X.21 circuit switched mode.                                                                                                                        |
| 32797                            | Station active. Context Manager cannot swap tasks at this time.                                                                                                                                                                                   |
| 32798                            | BMULTI was not deinstalled because the operating system is single partition.                                                                                                                                                                      |
| 32799                            | BMULTI was not deinstalled, either because the deinstall utility was not executed in the primary application partition (Context Manager installed) or because the Deinstall utility was not executed on the machine on which BMULTI is installed. |
| 32800                            | Line monitor facility is in use.                                                                                                                                                                                                                  |
| 32801                            | Data lost while monitoring.                                                                                                                                                                                                                       |
| 32802                            | BMULTI was not deinstalled because stations are active.                                                                                                                                                                                           |
| 32803                            | An attempt to call BmOpenII, requesting an unused virtual address, failed because there are no more unused virtual addresses.                                                                                                                     |
| 32804                            | Inconsistency between BMULTI and BmZip, BmConfig, or BmStatus. If you have configuration files created with a previous release level of BMULTI, you must replace them with new configuration files from the current release level.                |

| Status Code<br>(Decimal) | Explanation                                                                                                                                                                                               |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 32805                    | A change of extended character translation mode was attempted by <code>BmSetXlatMode</code> or <code>SetXlatModeBMULTI</code> when the station was not Idle, or the station is Online but not Fast Ready. |
| 32806                    | An invalid <code>iRcvMode</code> or <code>iXmitMode</code> was specified for <code>BmSetXlatMode</code> or <code>SetXlatModeBMULTI</code> .                                                               |
| 32807                    | The character translation file is incomplete or in unexpected format.                                                                                                                                     |
| 32808                    | The data contents of the character translation file are not valid ASCII. Valid values include: 0–9, A–F, a–f, or space (30h–39h, 41h–46h, 61h–66h, or 20h).                                               |
| 32809                    | <code>BmGetStatus (iRecordLen * nStation)</code> exceeds specified buffer size.                                                                                                                           |
| 32810                    | The number of stations or IO buffer size cannot be reconfigured dynamically.                                                                                                                              |
| 32811                    | BMULTI was already installed.                                                                                                                                                                             |
| 32812                    | An invalid node specification was passed to <code>SelectBMULTI</code> . See the "SelectBMULTI" procedural interface in Section 10 of the <i>CTOS BMULTI Operations and Programming Guide</i> .            |
| 32813                    | The report queue of the station requesting the report overflowed and the contents of the queue are now meaningless.                                                                                       |
| 56252                    | Multiple Gateways Service (MGS) is not available. You attempted to install BMULTI using a Service ID without first installing the MGS server.                                                             |
| 56253                    | Installation failed because a copy of BMULTI is already installed outside MGS.                                                                                                                            |
| 56254                    | Active poll/select address was not specified during dynamic reconfiguration.                                                                                                                              |
| 56255                    | DMA initialization was attempted after BMULTI successfully installed without DMA.                                                                                                                         |

| <b>Status Code<br/>(Decimal)</b> | <b>Explanation</b>                                                                                                                                     |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| 56256                            | Host connection cannot be established.                                                                                                                 |
| 60260                            | Application cannot be suspended.                                                                                                                       |
| 60261                            | Session active. An active session must be suspended before it can be resumed by another application.                                                   |
| 60262                            | Suspend/Resume session overflow. All available configured Suspend/Resume sessions are used up.                                                         |
| 60263                            | VADs not supported. Virtual addresses cannot be used as Suspend/Resume addresses.                                                                      |
| 60264                            | Invalid command. An application attempted to issue a suspend request on an active connection that was not initiated through the Suspend/Resume filter. |
| 60265                            | Invalid Service ID. A BmResume call was issued with an invalid Service ID in the parameter fields.                                                     |
| 60266                            | Application suspended. The current session is in the suspended state and will refuse all commands until the session is resumed.                        |
| 60267                            | Cancel command denied. The application state is "Receive Ready," "Receiving," or "Transmitting," and the session cannot be suspended.                  |



# Glossary

## A

### ASCII

The American Standard Code for Information Interchange, which defines the character set codes used for information transfer between equipment.

## B

### BMULTI

A system service used by CTOS workstations and shared resource processors to communicate with Unisys A-Series and V-Series mainframe systems using the BMULTI Poll/Select protocol.

### BMULTI/X.25

A system service used by CTOS workstations and shared resource processors to communicate with Unisys A-Series mainframe systems using the BTOS X.25 Gateway and a Public Data Network (PDN).

## C

### configuration

A process of entering specific information (in the form of parameter values) about your hardware, software, and network arrangement to BMULTI/X.25 or another program so that the program operates correctly on your system.

### configuration file

The BMULTI/X.25 configuration file contains the parameters used by BMULTI during its operation as a system service. The configuration file can be modified by using the CTOS Editor.

## D

### deinstalling BMULTI/X.25

The process by which BMULTI/X.25 is removed from a CTOS system as a system service.

### H

#### **High-Level Interface (HLI).**

A procedural interface to BMULTI intended primarily for application programmers who do not need to concentrate on the details of the BMULTI interface.

#### **HLI**

*See High-Level Interface*

#### **host**

A mainframe computer that provides data communications, data storage, data manipulation, and application program support for the network.

### I

#### **IDMSS**

Intelligent Data Communications Module Systems software.

#### **IDS**

A coprocessor, attached to a CTOS workstation, that specializes in the execution of data communication software. The IDS is controlled by the Intelligent Data Communications Module Systems software. There are two types of IDS available, the IDS (B25-IDS) and the enhanced IDS (B25-ID2).

#### **installing BMULTI/X.25**

The process by which BMULTI/X.25 is loaded on a CTOS workstation, IDS module, or shared resource processor as a system service.

### L

#### **LCN**

*See Logical Channel Number.*

#### **LLI**

*See Low-Level Interface.*

#### **Logical Channel Number (LCN)**

In BMULTI/X.25, logical channel numbers identify individual PVCs.

#### **Low-Level Interface (LLI)**

A procedural interface to BMULTI with a high degree of data communications control. It is intended to be used by applications needing access to advanced BMULTI communications features and services, including the BMULTI Suspend/Resume filter.

## P

### **parameters**

Values used by a program to define its operation. In the case of BMULTI/X.25, configuration file parameters are used to tell BMULTI/X.25 how to communicate with the host.

### **PVC**

*See* Permanent Virtual Circuit.

### **Permanent Virtual Circuit (PVC)**

A virtual circuit between two systems that has a fixed route for data communications, once the connection has been established.

## R

### **Release Notes file**

Contains information about BMULTI features and last minute update information. The Release Notes file is distributed on the BMULTI software installation disk.

## S

### **Service ID**

Used with the Multiple Gateways Service (MGS) to identify a gateway, or in the case of BMULTI/X.25, a specific copy of the BMULTI/X.25 system service running on a particular processor. Service IDs are defined for BMULTI/X.25 in the BMULTI/X.25 configuration files.

### **shared resource processor**

A CTOS XE-530 or XE520 processor system running either the XEBTOS or CTOS/XE operating system.

### **Shift-In/Shift-Out (SI/SO)**

A character sequence that allows BMULTI, which uses a 7-bit character, to use the entire 8-bit ASCII character set.

### **software installation**

The method through which files are copied from the product distribution disks onto the hard disk of a CTOS workstation or shared resource processor, request codes are updated, and new commands are created to use the new software.



### **SVC**

*See Switched Virtual Circuit.*

### **Switched Virtual Circuit (SVC)**

A virtual circuit between two systems that has no fixed route, that is, the data communications path can vary during a communications session.

### **system service**

Software that is loaded into the RAM memory of a workstation, IDS module, or shared resource processor. Once loaded, it handles requests for its whatever services it can provide. The BMULTI Agent, when configured and loaded into RAM, is a system service.

## **V**

### **VAD**

*See Virtual Address.*

### **VC**

*See Virtual Circuit.*

### **Virtual Address (VAD)**

The method by which BMULTI avoids timing out inactive stations on the host computer. VADs act like active addresses in the Idle state.

### **Virtual Circuit (VC)**

A logical connection between two systems, typically a host computer and a terminal, or in the case of BMULTI/X.25, an A-Series mainframe and a CTOS workstation or shared resource processor. This connection is called a virtual circuit because, although it may pass through a variety of switches, relays, and subsystems, the connection appears to be end-to-end to the users of the connection. Virtual circuits can be switched (SVCs) or permanent (PVCs).

# Index

## A

- A-Series host, 1-5
  - using X.25 MCS, 1-6
  - with the CP2000, 1-5
- address categories, 4-9
- examples, 4-10
- append P/S address to remote or local address, 4-8

## B

- BMULTI Poll/Select gateway, 1-1
- BMULTI/X.25
  - address categories, 4-9 to 4-10
  - character translation, 1-9
  - commands, 3-2
  - comparison with BMULTI Poll/Select, 1-2
  - configuration file, 4-1
  - deinstalling the system service, 4-14
  - disk usage, 2-2
  - extended characters, 1-9
  - facilities negotiation, 1-8
  - features, 1-3
  - files, 3-1
  - hardware requirements, 2-1
  - installing the product, 3-1
  - installing the system service, 4-11 to 4-13

- log file, 4-15
- Multiple Gateways Server (MGS), 2-5
- new features, 1-3
- on CTOS workstation, 1-6 to 1-7
- on shared resource processor, 1-6 to 1-7
- parameter definitions, 4-3 to 4-9
- parameters, 4-2
- product description, 1-1
- RAM usage, 2-2 to 2-4
- software requirements, 2-2
- system requirements, 2-1 to 2-5
- using previous versions, 2-4
- virtual circuits, 1-7
- BTOS X.25 Gateway, 1-1, 1-4
- buffer size, 4-4

## C

- call user data, 4-4
- character translation, 1-9
- commands, BMULTI/X.25, 3-2
- configuration file, 4-1
  - parameters, 4-2
  - parameter definitions, 4-3 to 4-9
- configuring and installing the system service, 4-1 to 4-15
- CUG Index, 4-6

### D

Deinstall BMX25, 3-2  
deinstalling the BMULTI/X.25  
    system service, 4-14  
default packet size, 4-4  
delivery confirmation, 4-3  
disk usage, 2-2

### E

error codes, A-1 to A-5  
extended characters, 1-9

### F

facilities negotiation, 1-8  
files copied to hard disk, 3-1

### H

hardware requirements, 2-1

### I

Install BMX25, 3-2  
installing the BMULTI/X.25 system  
    service, 4-11 to 4-13

### L

LCN, (*See* logical channel number)  
LCNs of PVCs, 4-5  
log file, 4-15  
log file name, 4-5  
logical channel number (LCN), 1-7

### M

map P/S address to LCNs, 4-7

map P/S address to remote address  
    or user data, 4-8  
migration and coexistence, 2-4  
Multiple Gateways Server (MGS),  
    2-5

### N

number of SVCs, 4-4

### P

Packet Size Negotiation, 4-7  
parameter definitions, 4-3 to 4-9  
    append P/S address to remote or  
        local address, 4-8  
    buffer size, 4-4  
    call user data, 4-4  
    CUG Index, 4-6  
    default packet size, 4-4  
    delivery confirmation, 4-3  
    LCNs of PVCs, 4-5  
    log file name, 4-5  
    map P/S address to LCNs, 4-7  
    map P/S address to remote  
        address or user data, 4-8  
    number of SVCs, 4-4  
    Packet Size Negotiation, 4-7  
    remote address, 4-4  
    Reverse Charging, 4-6  
    Service ID, 4-3  
    Throughput Class Negotiation,  
        4-6  
    timeout, 4-4  
    translate via translation table,  
        4-7  
    translation table, 4-5  
    VADs, 4-5  
    X.25 gateway node name, 4-3  
parameters, 4-2

PDN, (*See* public data network)  
public data network (PDN), 1-1,  
1-4  
PVC, 1-7

## R

RAM usage, 2-2 to 2-4  
Recommendation X.25, 1-4  
remote address, 4-4  
Reverse Charging, 4-6

## S

Service ID, 4-3  
Software Installation, 3-1 to 3-2  
    commands created, 3-2  
    files copied to hard disk, 3-1  
software requirements, 2-2  
status codes, A-1 to A-5  
subaddressing, 4-9 to 4-10  
SVC, 1-7  
system requirements, 2-1 to 2-5

## T

tasks and commands, 1-9  
Throughput Class Negotiation, 4-6  
timeout, 4-4  
translate via translation table, 4-7  
translation table, 4-5

## V

VADs, 4-5  
virtual addresses, (*See* VADs)  
virtual circuits (VCs), 1-7  
VC, (*See* virtual circuits)

## X

X.25  
    Recommendation, 1-4  
    gateway node name, 4-3  
    status monitor, 4-14







3915 4174-000